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Device for producing and palleting packaging boxes

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Description

The invention relates to a device for producing large
packs having a plurality of objects as pack contents,
10 in particular folded boxes for cigarette bundle packs,
the objects or bundle packs being fed to a box packer
and, with the formation of a pack group as box
contents, it being possible to introduce them into the
folded box and it being possible to feed the filled and
15 closed folded boxes to a palleting station for transfer
to a pallet.

For the dispatch of cigarette packs, bundle packs, what
are known as cigarette cartons, are usually formed and
20 these are introduced into a larger packing container,
namely into a folded box. The closed folded boxes are
then placed on pallets by a palletizer for transport.
Firstly the box packer and secondly the palletizer form
the independent technical units which have previously
25 been separated spatially from one another. EP 1 067 050
A2 shows one example for a box packer. In the exemplary
embodiment according to EP 0 949 169 A1, the finished
packs are fed to a palletizer via relatively long
conveying tracks, in particular on roller tracks.

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The invention is based on the object of improving the
construction and mode of operation of a device for
producing, in particular, box packs for cigarettes and
for palleting the latter, with regard to construction
35 and mode of operation.

In order to achieve this object, the device according
to the invention is distinguished by the fact that the
box packer and the palleting station or palletizer form

one technical unit, the box packer being arranged directly in front of the palleting station.

Accordingly, according to the invention, the units
5 which were previously separated structurally and functionally for producing the box packs and for loading pallets are combined to form a common device, the former forming one unit in structural and control technology terms. A portal robot which takes the boxes
10 from a depositing position and deposits them on a pallet by transverse displacement is used in the region of the palleting station. As an alternative, boxes can be transported beyond the depositing position past the pallet.

15 Further special features of the invention relate to the relative position of the individual assemblies with respect to one another, namely an L-shaped or U-shaped layout and the configuration of the palletizer.

20 One exemplary embodiment of the device according to the invention will be described in greater detail in the following text using the drawings, in which:

25 fig. 1 shows the apparatus for producing and palletizing box packs, in basic outline,

fig. 2 shows the device according to fig 1. in a
transverse view corresponding to the plane II-
30 II in fig. 1,

fig. 3 shows a side view of the overall device
according to the sight plane III-III in fig. 1,

35 fig. 4 shows a detail from fig. 3 in the region of a palleting station according to detail IV from fig. 3, on an enlarged scale, and

fig. 5 shows the detail according to fig. 4 in the case of a changed function of the device.

One object of the exemplary embodiment in the drawings
5 is the production of large packs for cigarettes, namely boxes 10, and the provision of the latter for dispatch by arranging a plurality of boxes 10 on the pallet 11.

The contents of the boxes 10 are bundle packs 12 for
10 cigarettes, what are known as cigarette cartons. In practice, the bundle packs 12 are delivered on a feed conveyor 13 coming from a bundle packer. The bundle packs 12 pass through the latter into the region of a box packer 14. The latter comprises a plurality of
15 units which are combined structurally, to be precise by carrying frames comprising longitudinal carriers 15, crossmembers 16 and vertical supports 17. A first unit in the functional sequence is a grouping station 18. The feed conveyor 13 opens into the region of the
20 former. A pack group 19 is assembled from the bundle packs 12. Said pack group 19, as the contents of a box 10, is pushed by a slide 20 out of the region of the grouping station 18 into a packing station 21.

25 A partially folded box 10 which is assembled into a three-dimensional shape is provided in the packing station 21, to be precise with one open side oriented toward the grouping station 18. Folding tabs 22 of the box 10 are situated in the unfolded, open position,
30 with the result that the pack group 19 can be inserted as a unit into the box 10 which is folded in the manner of a sleeve.

A blank magazine 23 is part of the packing station 21.
35 Said blank magazine 23 comprises a plurality of blanks for boxes 10, which blanks are folded flat and are provided as a folded tube. One after another, the blanks are removed from the blank magazine 23,

assembled and made available in the manner shown in the packing station 21.

After a pack group 19 has been introduced into the box 10, the latter is conveyed out of the packing station 21 by a conveyor 24 into the region of a closing station 25. On the transport path, the folding tabs 22 are folded over by folding members 26, to be precise into closing planes of the box 10 which are oriented laterally. In the closing station 25, the folding tabs 22 are fixed in the closed position, in the present exemplary embodiment by adhesive tapes 27 which are applied to the adjacent folding tabs 22 by tape guides 28 which are attached on both sides of the movement path of the boxes 10. The boxes 10 are then filled and closed, and can therefore be dispatched.

After the packing station 21 and after the closing station 25, the boxes 10 are introduced into a palleting station 29. The latter forms a technical unit with the packing station 21 and/or the closing station 25. A carrying frame comprising longitudinal carriers 30 and crossmembers 31 is connected to the correspondingly configured carrying frame of the adjacent unit.

The boxes 10 which come from the closing station 25 are conveyed onto a box receptacle 32 and deposited here. The box receptacle 32 comprises a conveyor, to be precise a section of a roller track 33. The latter is configured in such a way that a plurality of, namely (at least) two, boxes 10 can be made available on the box receptacle 32 following one another in the conveying direction. The position of the two boxes 10 is determined by stops, to be precise firstly by a central stop 34 which enters the movement path of the boxes 10 as a transverse web which can move up and down and determines the end position of the second box 10. At the end of the box receptacle 32 or the roller track

33, a likewise movable end stop 35 is provided as a stop for the box 10 which was conveyed onto the box receptacle 32 first.

5 The end stop 35 is configured in a special way and has a dual function. It is a track piece, namely a pivotable section of the roller track 33. In its function as an end stop 35, said track section is oriented upward (fig. 4). In another position (fig. 5),
10 the end stop 35 forms a continuation of the box receptacle 32 or of the roller track 33, to be precise as a bridge to a discharge conveying path 36. The latter is likewise configured as a roller track here and is oriented obliquely downward. In conjunction with
15 the end stop 35 which is configured as a track, the discharge conveying path 36 opens up the possibility of conveying boxes through the palleting station 29, for example identified faulty packs or in the case of temporary operational interruption of the palleting
20 station 29.

The palleting station 29 is oriented transversely with respect to the packing station 21 and the closing station 25 during the execution of the main function. A
25 lifting conveyor, namely a portal robot 37, in each case grips a box 10 in the region of the box receptacle 32. A pallet 11 is loaded by raising, transverse movement and depositing on the pallet 11 next to the box receptacle 32.

30 For handling the boxes 10 in the region of the palleting station 29, the portal robot 37 is configured in a special way with regard to construction and function. A lifting head 38, in particular a suction
35 head, grips in each case one box 10 on its upper side. The lifting head 38 is attached to a carrying arm 39 which is mounted as a projecting arm on a supporting framework. The carrying arm 39 extends over the full width of a basic surface area of the palleting station

29 defined by the pallets 11. The lifting head 38 can be moved with a moving mechanism 40 in the longitudinal direction of the carrying arm 39. Furthermore, the lifting head 39 is attached to a vertical carrying rod
5 42 which can be rotated by the motor 41, with the result that the boxes 10 which are gripped by the lifting head 38 can be rotated about a vertical axis.

The carrying arm 39 is mounted such that it can move up
10 and down, to be precise on a vertical loadbearing column 43. For this purpose, the carrying arm 39 is attached to a moving frame 44 which can be displaced on the loadbearing column 43, to be precise by a motor 45 via an (endless) pulling member such as a toothed belt.
15 The carrying arm 39 is connected to the moving frame 44 via a special supporting framework, namely by means of the corner component 46, in order to transmit the loads of the carrying arm 39 which act on one side to the moving frame 44 and therefore to the loadbearing column
20 43 without problems.

For its part, the vertical loadbearing column 43 can be displaced in the horizontal direction, to be precise along a rectilinear movement path next to the pallets
25 11 which are to be loaded. On one longitudinal side of the rectangular palleting station 29, a lower carrying beam 47 and an upper carrying beam 48 are attached in a stationary manner, in particular by connection (not shown) to the machine frame, for example to
30 longitudinal carriers of the palleting station 29. The loadbearing column 43 is connected to the lower carrying beam 47 and the upper carrying beam 48 in such a way that the loadbearing column 43 can be displaced on the two carrying beams 47, 48. In the case of a
35 vertical position of the end stop 35, the portal robot 37, namely the loadbearing column 43, can be displaced as far as the region of the box receptacle 32.

A motor 49 which is arranged on the upper carrying beam 48 serves for driving, which motor 49 drives a drive means within the (hollow) carrying beam 48 and a drive member in the lower carrying beam 47 via a vertical shaft 50. Here, these are preferably in each case belts, in particular toothed belts, which extend within the carrying beams 47, 48 over their length and to which a guide is attached which is connected to the loadbearing column 43 and can be displaced with the latter. Each box 10 can be gripped on the box receptacle 32 and deposited in a desired position on the pallet 11 by means of the lifting conveyor or portal robot 37 which is configured in this way, with short transport paths. As can be seen, the boxes 10 are positioned one above another in a plurality of layers on a pallet.

The pallets 11 are fed and kept available in a plane which is offset downward with respect to the conveying and provision plane of the boxes 10. The empty pallets 11 are introduced into the region of the palleting station 29 on one side (on the left in fig. 1) on rail-like underlying surfaces 51, and are displaced below the box receptacle 32 into a loading position next to the box receptacle 32. The dimensions are selected in such a way that a further empty pallet 11 is kept ready (fig. 2) next to the pallet 11 in the loading position. The loaded pallet is subsequently transported further from the loading position in the same movement direction (arrows) out of the region of the palleting station 29, in particular for being received by a suitable transport unit (not shown).

The device is distinguished by a compact construction, in particular also by the L-shaped or U-shaped layout. The units which are combined to form one, common device are connected to a common controller, in particular also to a common switch cabinet 52 for the electrical and electronic control units. The entire device can be

operated by a common control device 53 having a display screen. The control device 53 can be a standard (industrial) PC which controls the functions of the part assemblies of the device.

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List of Designations

10	Boxes
11	Pallet
12	Bundle pack
13	Feed conveyor
14	Box packer
15	Longitudinal carrier
16	Crossmember
17	Supports
18	Grouping station
19	Pack group
20	Slide
21	Packing station
22	Folding tabs
23	Blank magazine
24	Conveyor
25	Closing station
26	Folding members
27	Adhesive tapes
28	Tape guide
29	Palleting station
30	Longitudinal carrier
31	Crossmember
32	Box receptacle
33	Roller track
34	Stop
35	End stop
36	Discharge conveying path
37	Portal robot
38	Lifting head
39	Carrying arm
40	Moving mechanism
41	Motor
42	Carrying rod
43	Loadbearing column

44	Moving frame
45	Motor
46	Corner component
47	Carrying beam
48	Carrying beam
49	Motor
50	Shaft
51	Underlying surface
52	Switch cabinet
53	Control device